CESWT-PE-P 23 October 1998

Questions and Answers

from the
Public Meeting - September 22, 1998
subject:
Grand Lake, Oklahoma
Real Estate Adequacy Study, September 1998

The following 63 questions were submitted by the public to Congressman Tom Coburn to clarify information presented by the U.S. Army Corps of Engineers at the public meeting. Answers were provided by the Corps of Engineers, Tulsa District.

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1) *Has a recommended plan of action been proposed or adopted, and if not, what is the time frame for doing so?*

A general plan of action has been established. The next step, if authorized and directed by Congress, would be to evaluate the costs and impacts of: a) acquisition of additional flowage easements (as authorized by Section 560 of the 1996 Water Resources Development Act); and b) other identified measures. Public workshops are being scheduled for the coming weeks.

2) *Are the funds to purchase easements actually available at this time or does there still need to be an approved decision document and appropriation of funds for the acquisition* [of additional flowage easements]*?*

No, acquisition funds are not available. Further appropriations will be required. Although $25 million was <u>authorized</u> by Section 560 of the 1996 Water Resources Development Act and the Grand Lake Real Estate Adequacy Study was funded through the Energy and Water Appropriation Act of 1996, the remainder of the authorized $25 million (about $23.5 million) has not been <u>appropriated</u> and is not available for the acquisition of additional flowage easements. A "decision document" is needed to meet regulatory requirements prior to implementation of any Corps "project".

3) *Do you agree that the Water Resources Development Act of 1996, Section 560, required you* [the Corps of Engineers] *to identify any lands that have been adversely impacted by the operation of Pensacola Dam or should have been originally purchased as flowage easements for the project?*

Yes. And through coordination with Congressman Coburn, we agreed that the best approach to the issue of what "should have been originally purchased" was to evaluate Grand Lake as if it were a potential new project. We also agreed we would estimate flowage easement requirements based on current Corps of Engineers criteria.

4) *Since it* [the Water Resources Development Act of 1996] *says adversely impacted or originally purchased, there must be a difference. What is that difference relevant to this study?*

The Tulsa District interpreted the phrase "adversely impacted" to mean flooding caused or exacerbated by operation of Grand Lake to property where flowage easements are not held. The issue of what "should have been originally purchased" is addressed in response to question 3.

5) *Would the Corps look into what possible effect the RR bridge at Twin Bridges has on the problems of flooding from the Neosho River and on flooding of backwater to people on Spring River? In 1993 Highway 60 was closed due to backwater. Have had a lot of problems of backwater from the Neosho on many occasions.*

The RR bridge just downstream of Highway 60 at Twin Bridges is included in the backwater modeling, and its effects on backwater are included. Modeling to show how much, if any, backwater effect is caused just by the bridge has not been determined, but could be included in future studies.

6) *Should we continue to put money into improving our homes before this issue is resolved, or maybe just "stand by"?*

We can't answer that question for you. However, if your land is currently subject to a Federal flood easement, you would not be compensated by the Federal Government for any flood loss to such improvements or the underlying structure or real estate. No decision has been made to acquire additional easements at Grand Lake, and Congress has appropriated no funds for that purpose. If an easement were acquired on your land in the future, you would be paid for the value of the easement and any improvements that must be removed. Those values are established at the time of acquisition.

7) *As waterfront property owners, we have been flooded several times, but have found since GRDA has lowered the lake level, we have not had water in our house. Could not the highest flood level of 755 ft. be lowered to 750 ft.?*

Possible solutions could include lowering the top of the flood control pool.

8) *Possible solution. Would it be possible to dredge large areas of uninhabited flood plains instead of purchasing easements?*

Such a solution may be evaluated in future studies.

9) *When calibrating your* [Neosho River backwater] *model to known high water marks, what is the tolerable range of accuracy? For instance, do you look to get within one inch, six inches, or one foot of the known high water marks?*

The calculated water surface for each calibration storm matched the known high water marks to generally within ± 1 foot, with the majority being within ± 6 inches. For certain storms, the calculated water surface was higher than the high water marks, for other storms it was lower. One high water mark could only be matched within 1.9 feet. We assumed this one case to be caused by specific conditions for that event.

10) *With regard to the calibration of your* [Neosho River backwater] *model to the known high water marks, does your model calibrate for the entire range of flows or just for very small range of flows? If only for a range, what is the range?*

The calibration storms have a wide range of discharges. Calibrating with a wide range of discharges ensures that the model can recreate a larger variance of storms. The range of calibration discharges was from about 40,000 cubic feet per second to 97,000 cubic feet per second. A discharge of 267,000 cubic feet per second, which occurred during the flood of 1951, was also calibrated.

11) *Did the study indicate operation procedures contributed to the height of flood water and or duration?*

The study states that "…backwater impacts due to Pensacola Dam have exceeded existing flowage easements, and these areas would not have flooded during those events without the dam in place." This analysis was based on the period of record operation of the project. Duration of flooding was not addressed in the study.

12) *Did the map show impact on watershed since the dam was constructed?*

This study is based on the existing conditions of the lake and rivers and does not directly address historic changes in land use, channel shape, slope, or the degree of meandering.

13) *Based upon the study, are easements below 760 ft. being used more frequently than the 1940 study indicate? Will these owners be paid for the additional usage?*

A comparison of pool elevation-frequency was not made between the 1940 study and the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study. The land subject to flowage easements may be used as often as required for flood control purposes without additional compensation.

14) *Are the easements for flooding better or larger in the downstream areas from Grand Lake?*

No comparisons of flowage easements were made to downstream reservoirs for the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study.

15) *Are the areas* [Lake Hudson and Fort Gibson Lake] *filled prior to the backwater effect occurring in the Grand Lake upstream areas?*

The three lakes are operated as a system for control of floods on the Grand (Neosho) River and on the Arkansas River downstream from Fort Gibson. These projects are operated to minimize flood storage used in all projects with a goal of not allowing damaging releases from any project. The channel capacity restriction of 100,000 cubic feet per second below Grand Lake may cause Grand Lake to fill at a faster rate if area rainfall is generally above the Pensacola Dam or may cause Fort Gibson Lake to fill at a faster rate if the rain falls between Grand and Fort Gibson Lakes.

16) *What percentage of the easements located downstream of Grand Lake were flooded during the past floods in comparison to the percentage of easements flooded in the Grand Lake Flood Basin?*

The percentage of easements was not addressed in this study. However, the following table shows the maximum pool elevations at each dam site for the floods addressed in the study.

Storm	Pensacola Dam (Grand Lake)		Markham Ferry Dam (Lake Hudson)		Fort Gibson Dam (Fort Gibson Lake)	
	Elev	% Flood Pool	Elev	% Flood Pool	Elev	% Flood Pool
October 1986	754.97	99.7	635.93	99.5	582.02	100.1
December 1992	754.20	91.0	635.07	93.0	581.04	94.8
September 1993 *	754.47	94.0	623.67	22.4	569.82	44.2
April 1994 *	754.26	91.7	628.43	48.7	572.79	55.7
June 1995	754.96	99.6	635.95	99.6	582.02	100.1

* The higher percentage of filling in Grand Lake is caused by rain falling primarily above Pensacola Dam. Pensacola releases were constrained by channel capacity between Pensacola Dam and Lake Hudson. Fort Gibson Lake and Lake Hudson releases were not reduced solely to achieve a balance among the three lakes.

17) *Where can I get sand bags? I know I could have been saved if I had sandbags.*

Local community emergency managers normally have sandbags available for emergency use.

18) *How often under the law can the current federal easements be flooded?*

Lands subject to flowage easements may be used as often as required for flood control purposes.

19) *What is the capacity of Grand Lake in 1998 as compared to 1940?*

No comparison of current lake capacity to previous conditions was made in the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study.

20) *I have been told there is no personnel at the [Pensacola] dam to operate the flood gates on weekends. Is this information correct?*

The floodgates are operated by the Grand River Dam Authority (GRDA) as directed by the Corps. During non-duty hours, the Corps contacts the GRDA dispatching office, which in turn contacts personnel to make appropriate gate settings.

21) *How do I get information more than 1 day old on the Internet regarding the river levels on Spring River, at Quapaw, and the Waco Station on Grand Lake?*

Information regarding precipitation, river stage, river flow, pool elevation, lake storage, lake inflow, and lake releases on all lake and river gages can be found at the following internet address: “http://www.swt-wc.usace.army.mil/stations.htm”. A selection for "Previous Day" is shown after a specific location (such as Quapaw) is selected. Repeated selection of "Previous Day" will show data over the past 30 days.

22) *Since 1986, flowage rates and duration on the Neosho River has had significant impact on the river channel. Extensive bank caving and land loss has meant that an increased amount of sediments have ended up in Grand Lake, primarily in the upper reaches of the lake. How have these deposits changed the backwater effect?*

We did not evaluate changes in sedimentation over the years. The September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study evaluated current conditions which included current sedimentation conditions.

23) *EPA says I have to upgrade my underground storage tanks by Dec. 22 with no exceptions. Is there any way because of the flooding I could possibly get an extension? I have flooded 3 different times, 4 ft., 9 ft., and 4 ft. I don't want to spend this money and then try to recover it if my property is going to be bought for easement.*

The granting of an extension is not within our authority. You need to contact the EPA.

24) *In order to establish a fact based foundation for my question, does the Corps agree with the following statements?*

A. That Grand Lake is not owned by the Corps of Engineers?

B. That the land purchased for Grand's flood pool operation did not follow Corps real estate guidelines?

C. That Corps use of the top 5 feet of the flood pool is by rights of "easement privilege only"?

D. That flood pool easement use around Grand Lake is defined by the Corps as follows: "To inundate, submerge, and flow; to enter upon the lands from time to time" and in many cases do not prohibit structures for human habitation within the easement?

E. That the 21 days navigation taper and the balanced flood pool practices adopted by the Corps in 1974 were designed to protect the navigation channel from excessive flood flow releases and the resulting bank caving and dredging cost to channel maintenance?

F. That the above practices prolong and intensify lake flooding?

G. That when flowage easements are used 2-3 times a year for weeks, even months at a time, they become "storage easements" which belies the Corps definition?
Therefore: [Question 25]

A. The Corps has administrative jurisdiction of easement on private lands from where GRDA ownership ends (elevation 750) to elevation 757 at the dam, to elevation 758 through the main body of the reservoir, and to elevation 760 at the upper end of the reservoir.

B. We do not know what criteria were used for real estate acquisition by the Federal Works Administration, the Southwestern Power Administration, and the Grand River Dam Authority.

C. The Corps administers Federal flood easements over private land above GRDA ownership up to elevations ranging from elevation 757 at the dam to elevation 760 at the upper end of the reservoir.

D. Some easement estates acquired at Grand Lake and subsequently transferred to the Corps contain the "inundate, submerge, and flow…" language. For some of those easements, the easement holder has the right to remove structures. In some easements, the language does not specifically address removal of structures or prohibitions on human habitation.

E. We currently use tapered flood control releases (only during the last 5 to 9 percent of the system flood storage during flood season) to control flood damages to the river channel along the Grand (Neosho) and Arkansas Rivers, as well as, to reduce flood damages on the navigation system. The balanced system practice strives to provide equal protection to the floodplains below each of the 11 lakes in the system. The system operation does give Grand River projects priority for releases over Kaw, Keystone, Tenkiller, Eufaula, and Oolagah Lakes when the system storage is below 30 percent full.

F. The tapered flood control releases prolong the evacuation of the last 5 to 9 percent of system flood storage during flood season and the last 9 to 13 percent of the system storage during non-flood season. The balance system practice provides for larger releases for lakes at a higher percent full (but releases are still limited by channel capacity below each individual lake) and lower releases for lakes at a lower percent full.

G. The flowage easements grant the Corps the right to use the land for flood control purposes.

25) *(Therefore;* [from question 24]*) Following the purchase of these additional reservoir easements; will those of us who live around Grand Lake see a return to the abusive use of existing flowage easements lying below a full flood pool (elevation 750'-757')?*

The flowage easements are used for flood control purposes. The use of existing or additionally acquired flowage easements for flood control would depend on the occurrence of flood-producing rainfall events in the basin and in the Arkansas River system.

26) *You acknowledge a Corps report in the 1940's concluded that easements should be acquired as high as elevation 769 in the Miami area. You also acknowledge that the Corps prepared a 1948 preliminary planning report indicating that an additional 11,750 acres of easements should be acquired for operation of the project.*

1. Has there been aggradation in the riverbed in the Miami area?

2. If there has been aggradation in the riverbed, would that increase the water surface elevation for the same flow that was analyzed in 1948?

3. If the Corps did a study that concluded there was a need for 11,750 acres of additional easements, what has changed to cause the Corps now to estimate that only 3,560 acres need to be acquired?

1. No studies were conducted in the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study to determine if aggradation has occurred in the Miami area. Current stream conditions and geometry were used to develop the study.

2. If aggradation has occurred, its effect on the water surface elevation would depend on the amount, location, and type of material deposited.

3. The evaluation criteria and the lake conditions have changed. New topographic surveys were developed for the study, and over 45 years of additional stream flow data were used in the study. In addition, the Corps acquisition criteria changed in 1970.

27) *Have you done a study of the vegetation on and near the banks of the Neosho River as it was in the 1940's as compared to the 1990's? Assuming there has been an increase in vegetation below the 760 foot easement line, would that increase or decrease the water surface elevation in the 1940' vs. 1990's for the same flow?*

A study of the vegetation on the banks of the Neosho River comparing present conditions with that of the 1940's was not conducted as part of the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study. The study presents the results of a hydraulic model, which represents the channel configuration as it existed in late 1996 and 1997. This study was not meant to be compared to previous studies. If an increase in vegetation below elevation 760 has occurred, it has been accounted for in the current modeling through calibration with six storms that have occurred since 1986.

28) *Have you done a comparison of the roughness coefficient in the 1940's studies vs. the 1990's studies? If so, what is the conclusion and why has there been a change?*

We have not conducted a comparison of roughness coefficients between the present and 1940's conditions. The September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study presents the results of a hydraulic model which represents the channel configuration as it existed in late 1996 and 1997. The roughness coefficients used for the existing channel geometry recreated historical high water marks.

29) *You state in your report on page 3 that a 1960 memo from Thomas Quaid noted that operation of the Pensacola Reservoir since the 1951 flood had been carried out without complaint from people in the effected area. You then state: "Because the operation proved satisfactory, acquisition of additional lands was not recommended at that time." What policy or procedure allows the Corps of Engineers to make a determination of whether to acquire additional property based on whether people are complaining or suing them? Wouldn't you agree that if Pensacola Dam was affecting the flooding upstream, the people should be compensated whether they were complaining or not?*

As to the first question, there is no policy or procedure that allows the Corps of Engineers to make a determination of whether to acquire additional property based on whether people are complaining or suing. As to the second question, the study did not determine whether landowners should be entitled to compensation.

30) *On page 3 of your report you state: "The 50-year flood* [along the Neosho River], *calculated at the time, would have a peak flow of 150,000 cubic feet per second." Has there been a subsequent calculation that altered that conclusion?*

The discharge frequency calculations have not changed. The 50-year flood peak discharge is 150,000 cubic feet per second for the reach of the Neosho River in the vicinity of Miami.

31) *Do you agree that raising the lake elevation in the power pool for normal operation has increased the number of the times the lake elevation has risen into the flood pool? Do you agree that an increased lake elevation moves the backwater effect up the Neosho River? Do you acknowledge there are times the increased lake elevation has increased the water surface elevation in the Miami area?*

The initial condition of the lake before a storm event determines how much volume is available for collection of runoff. A higher initial lake elevation can reduce the amount of available storage for flood routing. Higher lake elevations can also increase the backwater effect for like discharges. Even though this study shows that there are impacts on lands above the existing easements, it does not show how those impacts would change with a different project operation plan.

32) *Since Section 560 states that you should identify the property <u>that should have been originally</u> purchased as flowage easements, is it now appropriate to say the Corps originally identified up to elevation 769 as the elevation to which <u>easements should have been acquired</u> and originally identified 11,750 of easements which should have been acquired for the operation of the project? Therefore, is it fair to say that is the property which should have originally been purchased as flowage easements for the project?*

The existing easements were acquired under the acquisition policy appropriate to the acquiring agencies at the time of purchase (GRDA, Southwestern Power Administration, and Federal Works Administration). We do not know what those criteria were. It should be noted that the acquisition policy of the Corps of Engineers has changed several times since the date of Grand Lake real estate acquisition. In the study, we identified lands that we would have purchased given the application of our current acquisition policy, if Grand Lake were a potential new project.

33) *Do you admit that as part of the flood control policy there are to be pre-releases from Pensacola Dam in anticipation of flooding? On how many occasions has the Corps directed GRDA to release water before the lake elevation reached 745?*

The Corps has directed flood control releases from Pensacola while the lake was below the top of the power pool, elevation 745.0, at least 28 times since 1944, with 13 of those being since 1985. The Water Control Manual states the following: "If the pool is forecasted to exceed elevation 745, the Corps may direct that flood control releases be made, provided that there is a sufficient volume of water indicated by stages at the upstream gages to fill the power pool." However, Pensacola would still be operated as part of the system and would be operated as discussed in question 15.

34) *Is this a final report? Is this the determination of what property was adversely impacted or what property should have been originally purchased as flowage easements for the project? If not, what else is going to be done?*

The September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study is final. To the extent of available time and funding and based on current Corps of Engineers criteria, the problem of insufficient flowage easements for operation of Grand Lake was confirmed. The study and its findings provide an interim response to Section 560 of the 1996 Water Resources Development Act as directed by guidance from the Headquarters, U.S. Army Corps of Engineers. This study did not, however, identify impacts to individual ownerships that would be required if acquisition of additional flowage easements is determined to be the plan of action. Neither did the study examine alternative measures formulated to reduce or eliminate the need for additional flowage easements. Guidance from Headquarters, U.S. Army Corps of Engineers for implementation of Section 560 of the 1996 Water Resources Development Act directed that the effort undertaken to develop the September 1998, Grand Lake, Oklahoma Real Estate Adequacy Study should determine the need for additional real estate acquisition. And, if warranted by the findings of the effort, to prepare a decision document to summarize the investigation and present a recommended plan of action. It was further directed that the recommended plan should be the most cost-effective alternative available and that the decision document should document environmental compliance. The evaluations to be summarized in a decision document would be the next step. Public workshops tentatively scheduled for the end of October and in November are the beginning of that process. The workshops provide the first opportunity for public input into the formulation of alternatives to be considered.

35) *What is meant, as stated on page 10 of the report* [September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study]*, that this report does not determine the exact extent of the backwater effects of the various floods?*

Although the analysis of historic floods determined backwater impacts exceeded existing flowage easements, only a selected number of flood events were evaluated. Impacts to individual properties were not evaluated.

36) *What is meant, as stated on page 10 of the report* [September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study], *that this report does not evaluate the significance of the flooding caused by the dam?*

The significance of backwater impacts depends on backwater depth, frequency, and duration of flooding. These parameters were not evaluated. Evaluation of the significance of flooding would require the evaluation of individual properties and that was beyond the scope of the study.

37) *Is it true that a full determination of the exact extent of the backwater impacts of Pensacola Dam were beyond the scope of the study?*

Yes.

38) *What is meant, as stated on page 11 of the report, that the backwater impact, specifically due to flood control operations on lands around the reservoir for which real estate interests were not held, have not been evaluated?*

Only the impact of overall project operation was evaluated. The individual impacts of flood control or hydropower operation were not examined.

39) *On page 11 of the* [September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study] *report you state that additional analysis may be desirable to further develop the finding of the report. What additional analysis are contemplated in that statement?*

(Same as response to question 34.) The September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study is final. To the extent of available time and funding and based on current Corps of Engineers criteria, the problem of insufficient flowage easements for operation of Grand Lake was confirmed. The study and its findings provide an interim response to Section 560 of the 1996 Water Resources Development Act through guidance from the Headquarters, U.S. Army Corps of Engineers. This study did not, however, identify impacts to individual ownerships that would be required if acquisition of additional flowage easements is determined to be the plan of action. Neither did the study examine alternative measures formulated to reduce or eliminate the need for additional flowage easements. Guidance from HQUSACE for implementation of Section 560 of the 1996 Water Resources Development Act directed that the effort undertaken to develop the September 1998, Grand Lake, Oklahoma Real Estate Adequacy Study should determine the need for additional real estate acquisition. And, if warranted by the findings of the effort, to prepare a decision document to summarize the investigation and present a recommended plan of action. It was further directed that the recommended plan should be the most cost-effective alternative available and that the decision document should document environmental compliance. The evaluations to be summarized in a decision document would be the next step. Public workshops tentatively scheduled for the end of October and in November are the beginning of that process. The workshops provide the first opportunity for public input into the formulation of alternatives to be considered.

40) *On page 6 of the report* [September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study], *you state that you analyzed this as a potential project. When you were doing your modeling, did you calibrate to known high water marks, which would have been influenced by the existence of the project or did you evaluate it as if there was no dam?*

The model was calibrated with storms that have occurred with Grand Lake in operation.

41) *On page 7 of the report, you identify the intent of Congress to identify lands that may be impacted beyond the limits of existing flowage easements. Isn't it true that there is a significant possibility that there are additional lands which may be impacted beyond the limits of existing flowage easements that extend beyond the 3,560 acres which you identified in this report?*

Based on the evaluation criteria presented in the study, the estimated 3,560 acres would be impacted. If further evaluations are directed and funded by Congress, changes in evaluation criteria could result in other findings.

42) *Isn't there a policy of the Corps to add a three foot safety factor in inhabited areas or flat ground rather than a two foot safety factor? If so, wouldn't the City of Miami and the Miami area satisfy at least one of those criteria?*

Southwestern Division Engineering Technical Letter 1110-2-22, states that freeboard is to be used in the flat pool area of the reservoir and that the Guide Taking Line is to follow the backwater envelope curve in the backwater areas. The two feet of freeboard in the flat pool corresponds to the top of dam.

43) *On page 7 of your report, you state that you concluded that the situation above Pensacola involved "reservoir perimeter areas which will have no urban or highly concentrated developments." Wouldn't the presence of Miami make that an incorrect conclusion?*

The 50-year Land Acquisition Flood was assumed for the evaluation. This assumption may be changed if a feasibility level study is directed and funded by Congress.

44) *If this study was characterized as relating to "reservoir perimeter areas which will have urban or highly concentrated developments", how would your conclusion differ?*

Areas within the flat pool would not change because the Guide Taking Line is already shown as top of dam. Backwater areas defined as urban or highly concentrated developments, would follow the envelope curve described by the Standard Project Flood and lesser storms with appropriate freeboard.

45) *It appears you used a land acquisition flood of once every 50 year frequency in an amount of 150,000 CFS* [along the Neosho River] *in your analysis. What is the standard project flood for Pensacola Dam? Did you do any analysis to determine how the results might vary if you used the standard project flood as opposed to the land acquisition flood in your analysis of the adequacy of the existing easements?*

The Standard Project Flood inflow at Pensacola Dam is about 460,000 cubic feet per second. The SPF discharge on the Neosho River in the vicinity of Miami is 300,000 cubic feet per second. A detailed outline of the backwater effects from the SPF being used as the Land Acquisition Flood has not been determined. However, areas within the flat pool would not change because the Guide Taking Line is already shown as top of dam. Backwater areas defined as urban or highly concentrated developments would follow the envelope curve described by the SPF and lesser storms with appropriate freeboard.

46) *Do you admit that your current statement that "backwater impacts due to Pensacola Dam have exceeded existing flowage easements, and these areas would not have flooded during those events without the dam in place" is contrary to statements which the Corps made publicly to this community within the last twelve and even the last few years?*

The study states on page 10 that "Analysis of a selected number of historic floods on the Grand River indicated backwater impacts due to Pensacola Dam have exceeded existing flowage easements and these areas would not have flooded during" selected prior flood events without the dam in place. Prior public statements by the Corps were based on the information that was available at the time the statements were made. The information gained from the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study was not available.

47) *On page 11 of* the [September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study] *report you use the phrase "approximately 3,500 acres of additional easements would be considered for real estate acquisitions." What factors would be involved in the consideration? Why wouldn't the Corps offer to purchase easements for all 3,560 acres?*

As stated in the report on page 11, the identification of about 3,500 acres (more specifically identified as 3,560 acres elsewhere in the report) was based on the premise of Grand Lake being a new Federal project using the guide taking rules of the Southwestern Division, which is a guide for determining flowage easements including freeboard.

48) *What is Figure 2 of* the [September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study] *report meant to illustrate? Is that showing that all of the property that is within the light yellow should have easements?*

No. The area presented in Figure 2 was identified early in the study process as an example of a rural area where flooding was a public concern. For this evaluation, using the guide taking rules of the Southwestern Division, none of the area in Figure 2 lies within the 3,560 acres presented in the study that would be considered for real estate acquisition if Grand Lake were a new Federal project. Note that the legend for the "Limits of Backwater Effects (GTL) …" shown on other figures is not present on Figure 2. The appearance of yellow on Figure 2 is an accident that occurred during color reproduction. The color should have been a rusty brown similar to the color commonly used on U.S. Geological Survey topographic maps.

49) *For the backwater modeling from Pensacola Dam to Twin Bridges, which would be river mile 77 to 130.5, is it true you used the expert report from GRDA in the litigation involving the landowners in Ottawa County? Why?*

Yes. Detailed hydrographic information was only obtained in the backwater reaches along the studied tributaries due to time and financial constraints. Pertinent underwater topographic information available for the body of the lake was located by searching documentation available at the time of the study. Information pertinent to modeling was reviewed for accuracy and incorporated when appropriate.

50) *In Table A-5 it appears that the guide taking line in the Miami city area is approximately 765 tapering slightly to 764.5 at the Highway 69 Bridge and then decreasing to 760 at Commerce Gage. Is that accurate? So is it fair to assume that the boundary of the yellow areas shown in the figures relevant to the "Real Estate Adequacy Study are to approximately elevation 764.5 to 765.5 between the Will Rogers Turnpike and Highway 69 and then decreasing to 760 at Commerce Gage?*

Yes. The information shown in Table A-5 of the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study was used to develop the boundary of the yellow area on the figures in the study.

51) *The backwater curve for the Neosho River is shown on Plate 4 of the report. If Dr. Simons is correct in his criticism and the Corps has used too large of "n" values in the channel and too small of "n" values over bank, would that move the backwater curve farther upstream? Also, would that increase the elevation of the top of the hump of the backwater curve?*

Dr. Simons report and data have not been reviewed; therefore, we have no comment on its validity. We stand by our studies and findings.

52) *It is confusing what was actually used as the flow for the land acquisition flood and the standard project flood. What are the flows used for those two?*

The 50-year frequency discharge was used as the Land Acquisition Flood. The 50-year and Standard Project Flood discharges at Pensacola Dam are 190,000 and 460,000 cubic feet per second, respectively. The 50-year and SPF discharges for the Neosho River in the vicinity of Miami are 150,000 cubic feet per second and 300,000 cubic feet per second, respectively. The discharges for the full range of frequencies are shown in Table B-6.

53) *Do you consider the area in and around Miami to be relatively flat? If you agree that it is relatively flat, do you believe that should be a factor in determining the amount of freeboard used in establishing the guide taking line?*

Even though the slope of the terrain around Miami is generally flat, the Southwestern Division Engineering Technical Letter 1110-2-22 does not provide for consideration of slope for determining freeboard for the Guide Taking Line.

54) O*n Plate 10 the guide taking line stops at 385,000 feet, which is approximately halfway between Highway 69 and Commerce Gage. It stops at elevation 762. Why is there such an abrupt end and why doesn't it continue to taper down to the Commerce Gage?*

The envelop curve converges with the top of the river bank at station 385,000. Any effects upstream are within the channel banks.

55) I*n your analysis of discharge frequencies, you use the period from 1940 through 1995. It is my understanding that this study was not concluded until 1998. Why did you not use the 1996 and 1997 flow information in calculating the frequency analysis?*

The hydrologic studies must be completed before backwater studies can be finalized. The hydrologic studies were performed in 1996. The latest information available at that time was through 1995.

56) *In a document attached to the report entitled "Guidance for Implementing Certain Provisions of the Water Resources Development Act of 1996", the Corps states in the synopsis that the study will do the following: "The effort initiated in fiscal year '97 will assess the problem and determine whether there has been a 'taking' of real estate rights." The report states that was not done. Why not?*

The term "taking of real estate rights" used in the referenced guidance was further defined in the guidance as an engineering study to "…determine the scope of backwater effects…" and "…identify any lands adversely impacted by the operation…" of Pensacola Dam. The guidance was followed and the results are presented in the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study. The term "taking of real estate rights" used in the referenced guidance is different than a formal takings analysis. A formal takings analysis was beyond the scope of the study.

57) *The same document states that the study would also determine the economic impacts of acquiring easements, if recommended. Has that occurred? What was the conclusion?*

No, that has not occurred. Economic analysis was not required or conducted as part of the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study. The referenced guidance directs those analyses to be part of a feasibility level study.

58) *Is this report inconsistent with the 1956 annual Corps report stating: "The estimated cost for acquisition of additional flowage easements necessary for operation of the reservoir to elevation 755 is $1,760,000?"*

Estimated costs of additional flowage easements were not developed as part of the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study.

59) *Is your current study consistent with the April 6, 1995 memo from Steve Siegele to Marc Masnor, which stated: "GTL follow envelope curve except in urban areas where it should be 3' above the envelope curve"?*

The Southwestern Division Engineering Technical Letter 1110-2-22 states that freeboard is to be used in the flat pool area of the reservoir and that the Guide Taking Line is to follow the backwater envelope curve in the backwater areas. If the Standard Project Flood were adopted as the Land Acquisition Flood, then the Guide Taking Line would be established as the SPF envelope curve with appropriate freeboard.

60) *Based on your study, are the easements below 760 being used more frequently than anticipated when they were acquired in the 1940's? If so, do you plan on compensating the landowners for that additional use?*

A comparison of current pool elevation-frequency to information used for the original acquisition was not made. Original acquisition criteria and elevation-frequency information are not known. Lands subject to flowage easements may be used as often as required for flood control purposes; therefore, no additional compensation is appropriate.

61) *Does your current study concur with your earlier 1969 study for the city of Miami that the bridges across the Neosho River are not serious obstructions to stream flow?*

Yes. The September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study agrees with the statement from the 1969 Flood Plain Information, Neosho River and Tar Creek, Miami, Oklahoma, June 1969, which states, "Obstructions to the Neosho River flows caused by the bridges are negligible because of the deep inundation of their approaches", and is true for the range of discharges discussed in the 1969 document.

62) *On page 11 of the report you refer to the "theoretical backwater effects of Grand Lake." What do you mean by theoretical?*

The term "theoretical" was used to distinguish theoretical (or hypothetical) floods from historical flood events.

- ✓ Hypothetical floods are derived using statistics based on rainfall and stream flow. Hypothetical floods are often created to represent a certain frequency flood; such as 10-year, 50-year, or 100-year floods.

- ✓ Historical flood events are actual past events. Historical events for which a maximum stage has been established (a high water mark) or more detailed information has been recorded (such as hourly stages throughout the event) are used to validate computer models. The validated computer models are then used to develop hypothetical floods and calculate their effects.

63) *Are the conclusions for this report consistent with the 1989 Reconnaissance report for 50 year flood at: River mile 142.35 @ 771.97; River mile 143.47 @ 773.64;River mile 144.02 @ 774.07; and River mile 145.06 @ 775.16?*

The 50-year profile for the September 1998, Grand Lake, Oklahoma, Real Estate Adequacy Study is consistently higher than that shown for the 1989 Reconnaissance report using the same discharge. The elevations computed for the 50-year discharge during this study are shown below for the designated locations:

1989 Report	1998 Study
River mile 142.35 @ 771.97	Approx. Station 343180 @ 773.8
River mile 143.47 @ 773.64	Approx. Station 349080 @ 776.7
River mile 144.02 @ 774.07	Approx. Station 351900 @ 777.4
River mile 145.06 @ 775.16	Approx. Station 357350 @ 778.2